

What is claimed is:

1        1. A storage device comprising:

2              a probe having a tip and a first plate;

3              a storage medium,

4              the tip of the probe adapted to form a dent in the storage medium to represent a

5 state of data bit; and

6              a second plate,

7              wherein the first plate and second plate cooperate to provide a variable

8 capacitance that varies between different capacitance values depending on whether the tip of

9 the probe is engaged in the dent.

1        2. The storage device of claim 1, further comprising a gas between the first and

2 second plates, the gas forming a dielectric of the variable capacitance.

1        3. The storage device of claim 1, wherein a layer of the storage medium forms at

2 least a part of the dielectric of the variable capacitance.

1        4. The storage device of claim 1, wherein the first and second plates are

2 separated by a first distance in response to the tip of the probe being in the dent, and

3              wherein the first and second plates are separated by a second, different

4 distance in response to the tip of the probe being engaged on a surface of the storage medium

5 but not in the dent.

1        5. The storage device of claim 4, wherein the variable capacitance has a first

2 capacitance value in response to the first and second plates being separated by the first

3 distance, and wherein the variable capacitance has a second capacitance value in response to

4 the first and second plates being separated by the second distance.

1        6. The storage device of claim 5, further comprising a measurement device to

2 measure a value of the variable capacitance during a read operation.

1           7.       The storage device of claim 6, wherein the tip is heatable to an elevated  
2       temperature to form the dent during a write operation.

1           8.       The storage device of claim 7, further comprising storage cells in the storage  
2       medium, the tip of the probe adapted to selectively form dents in respective storage cells to  
3       represent states of corresponding data bits.

1           9.       The storage device of claim 8, wherein presence of a dent in a storage cell  
2       represents a first logical state of a corresponding data bit, and absence of a dent in a storage  
3       cell represents a second logical state of a corresponding data bit.

1           10.      The storage device of claim 1, wherein the variable capacitance comprises a  
2       first variable capacitance, and wherein the probe has a third plate electrically connected to the  
3       first plate,

4                 the storage device further comprising a fourth plate spaced apart from the third  
5       plate,

6                 wherein the third plate and fourth plate cooperate to provide a second variable  
7       capacitance that varies between different capacitance values depending on whether the tip of  
8       the probe is engaged in the dent.

1           11.      The storage device of claim 10, wherein the first and second variable  
2       capacitances are arranged in parallel, the storage device further comprising a capacitance  
3       measurement device to measure an overall capacitance provided by the first and second  
4       variable capacitances.

1           12.      The storage device of claim 10, wherein the storage medium is between the  
2       probe and a plane containing the second and fourth plates.

1           13.      The storage device of claim 10, wherein the probe is between the storage  
2       medium and a plane containing the second and fourth plates.

1           14.      The storage device of claim 1, wherein the storage medium is between the  
2       probe and the second plate.

1           15. The storage device of claim 1, wherein the probe is between the second plate  
2 and the storage medium.

1           16. A system comprising:  
2           a processor; and  
3           a storage device comprising:  
4            a probe having a tip and a first plate;  
5            a storage medium,  
6            the tip of the probe to form a dent in the storage medium during a write  
7 operation; and  
8            a second plate spaced apart from the first plate,  
9            wherein the first plate and the second plate cooperate to provide a  
10          variable capacitance that varies between different capacitance values depending on whether  
11          the tip of the probe is engaged in the dent.

1           17. The system of claim 16, wherein the storage device further comprises circuitry  
2 to measure a value of the variable capacitance to detect a storage state.

1           18. The system of claim 16, wherein the first and second plates are separated by a  
2 first distance in response to the tip of the probe being in the dent, and  
3           wherein the first and second plates are separated by a second, different  
4 distance in response to tip of the probe being on a surface of the storage medium but not in  
5 the dent.

1           19. The system of claim 16, wherein the storage device further comprises:  
2           a second probe having a tip and a third plate, the tip of the second probe  
3 adapted to form a second dent in the storage medium; and  
4           a fourth plate spaced apart from the third plate,  
5           wherein the third plate and fourth plate cooperate to provide a variable  
6 capacitance that varies between different values depending on whether the tip of the second  
7 probe is engaged in the second dent.

1        20. The system of claim 16, wherein the storage medium comprises a plurality of  
2 storage cells, wherein the tip of the probe is adapted to program a first one of the storage cells  
3 by forming a dent in the first storage cell, and to program a second one of the storage cells by  
4 not forming the dent in the second storage cell.

1        21. The system of claim 16, wherein the probe comprises a nanotechnology probe.

1        22. A method of reading data in a storage device, comprising:  
2                scanning a probe over a storage medium having dents formed in the storage  
3 medium, wherein the probe has a tip and a first plate;  
4                engaging the tip of the probe at a first position on the storage medium such  
5 that the tip engages a dent, wherein the first plate of the probe cooperates with a spaced apart  
6 second plate to form a first capacitance at the first position; and  
7                positioning the probe at a second, different position on the storage medium  
8 such that the tip of the probe is not engaged in a dent, wherein the first plate and the spaced  
9 apart second plate cooperate to form a second capacitance at the second position, the second  
10 capacitance being different from the first capacitance.

1        23. The method of claim 22, wherein the first plate and the second plate cooperate  
2 to form a variable capacitance, the method further comprising:  
3                measuring a value of the variable capacitance.

1        24. The method of claim 23, wherein measuring the value of the variable  
2 capacitance is performed with a measurement device, the measurement device measuring a  
3 first capacitance value in response to the tip of the probe being engaged in a dent, and the  
4 measurement device measuring a second capacitance value in response to the tip of the probe  
5 not being engaged in a dent.

1        25. The method of claim 24, further comprising detecting one of the first  
2 capacitance value and the second capacitance value during a read operation.

1        26. The method of claim 25, further comprising using the tip of the probe to form  
2        the dents during a write operation.